The Potato Cyst Nematode (*Globodera rostochiensis*)
A Pest of National Importance

The Potato Cyst Nematode (*G. rostochiensis*, a.k.a. the Golden Nematode/GN) is A Threat to US Agriculture

♦ The PCN/GN is present in the U.S., but has been successfully confined for more than 60 years to a very small part of New York. If it becomes established in potato, tomato, and eggplant production areas, it would cause an estimated $0.5 to $4.8 billion in annual losses to host crops.

♦ If the PCN/GN spreads to new sites in the US, it will result in trade embargoes and compromise domestic and international trade. This would affect not just the potato industry, but any agricultural commodity in contact with soil (e.g. all nursery, turf, root, and tuber crops).

♦ Once the pest is introduced into a field, it is almost impossible to eradicate. The PCN/GN can survive in soil for more than 30 years.

Potato yield losses caused by the PCN/GN. Yield on the left was from a PCN/GN-free field; Yield on the right was from a PCN/GN-infested field.

PCN/GN immature females and cysts on potato roots

The PCN/GN is Quarantined in the US

♦ The PCN/GN is distributed in potato-growing areas worldwide.

♦ In the US, the PCN/GN is a quarantined pest and has been confined by effective management to nine counties within the state of New York.

♦ In North America, the PCN/GN is found in isolated locations. In Canada, the PCN/GN occurs in Newfoundland and on Vancouver Island. In Mexico, the PCN/GN exists in nine states.

Managing the PCN/GN in the US

♦ In the United States, control of the PCN/GN requires strict adherence to regulatory and quarantine procedures, and the annual survey of infested, exposed and non-exposed acreage.

♦ The availability and cropping of commercially marketable PCN/GN-resistant potatoes is essential.

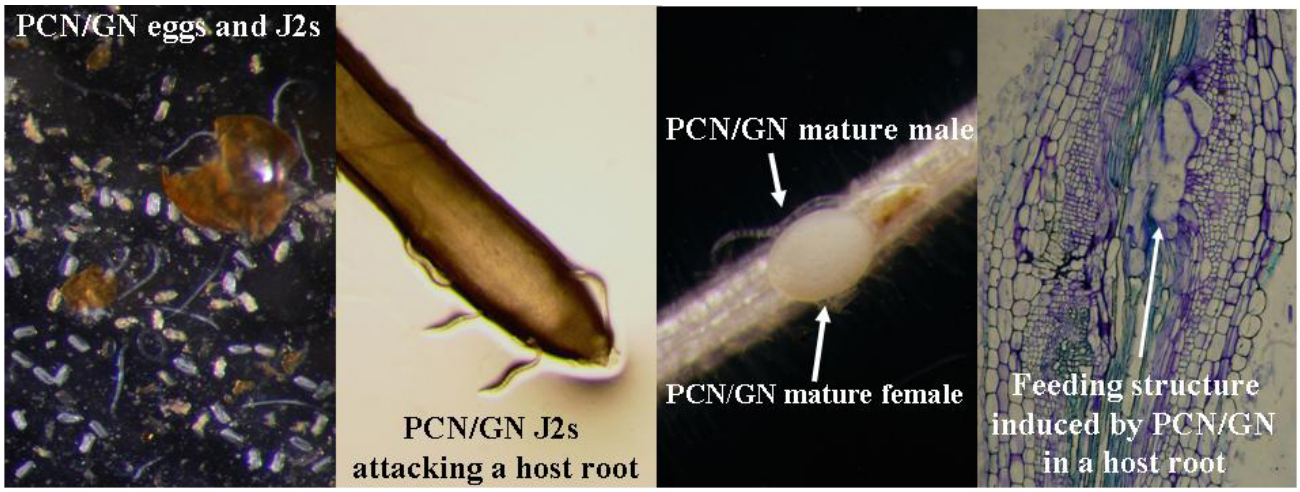
♦ Regulatory agencies such as the USDA-APHIS and the New York State Department of Agriculture and Markets must work cooperatively with research and extension leaders and with growers in the implementation of a PCN/GN management plan.

The Biology of the PCN/GN

♦ The PCN/GN is a microscopic root parasite that infects a small range of solanaceous plants including the economically important crops of potato, tomato and eggplant.

♦ During the PCN/GN life cycle, infective second-stage juveniles hatch from eggs within the cysts in the soil and penetrate host roots to induce permanent feeding sites for development and reproduction. After feeding, the nematode undergoes three molts to become a reproductive adult.

♦ The PCN/GN reproduces sexually. After fertilization, eggs develop within the female body. Eventually, the female dies and its remaining cuticle forms a protective cyst enclosing several hundred eggs. The PCN/GN cysts can remain viable for many years in the soil.



Research is Essential for Novel Strategies of the PCN/GN Control

The PCN/GN research program supported by USDA-ARS and Cornell University plays a central role for the PCN/GN control in the US. This research program focuses on:

♦ The investigation of the molecular basis of PCN/GN-potato interactions using molecular biology, functional genomic and proteomic approaches.

♦ The development of PCN/GN resistant potato varieties.

♦ The provision of research expertise to support USDA-APHIS PCN/GN quarantine activities.

The PCN/ GN resistant potato variety "Marcy" developed by Cornell Potato Breeding Program grown in the Foundation seed potato fields.

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